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ABSTRACT

An examination of the reasons behind the strong evidence that practice in sentence combining leads to overall superiority in writing began with the development of a more precise syntactic instrument than had been used previously and a new set of criteria for rhetorical analysis which focused on unity, organization, succinctness, and cohesiveness. A measure of the cognitive dimensions of text that defines the degree to which the writer abstracts from primary data was also used. These instruments were used to re-analyze writing samples from a previous study. The rhetorical and cognitive analyses revealed that sentence combining does seem to develop or enhance certain skills that transfer to the level of discourse and result in more unified, organized, coherent, and concise writing. Whether that phenomenon represents real cognitive development or creation of a set of useful habits remained unclear. However, sentence combining did not seem to develop the ability or inclination to ascend to higher levels of abstracting. Further investigation by direct classroom observation, comparison of achievement in programs with and without instruction in sentence combining, and use of cognitive tests and procedures to determine the occurrence and extent of actual cognitive changes during writing instruction are recommended. (MSE)

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Sentence Combining: Some Questions

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Sentence combining has received a great deal of attention in the field of composition study in the last fifteen to twenty years. Researchers have conducted a series of carefully controlled studies evaluating the impact of sentence combining instruction on students of all levels, from elementary school through to university. Writing teachers have been developing curricula incorporating—and sometimes entirely based on—sentence combining programs. Sentence combining workshops have proliferated, and it is a rare conference on writing that does not include a segment devoted entirely to this pedagogy.

Yet despite this attention by researchers, by theorists, by teachers, there are many unanswered questions about sentence combining instruction. There seems to be strong evidence, for example, that intensive and extensive practice in sentence combining leads students to write pieces that are not only syntactically more mature but, more significantly, holistically superior to those written by students taught by other methods. The unanswered question, however, is why this is so, why sentence combining practice leads to overall superiority in writing.

It was to explore (if not to answer) this and related questions that my colleague, Ian Pringle, and I developed our own research project investigating sentence combining. Given the strength of the evidence and the quality of the research pointing to the conclusion that sentence combining instruction does lead to holistically superior writing, we chose not to replicate such primary research, but rather to perform a secondary analysis of the data collected in one such study. Our aim was to probe and explore these same data from a variety of different perspectives in order to understand why sentence combining achieved such results. To this end, we developed a number of syntactic and rhetorical instruments that

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were more highly refined and finely calibrated than those typically used in sentence combining research. In addition, we looked at that cognitive dimension of the writing that can be measured on a level of abstracting scale.

The primary research we chose to re-investigate was the exemplary study of sentence combining at the college level performed by Daiker, Kerek, and Morenberg at the Miami University of Ohio. These researchers very generously and graciously agreed to make available all the essays collected as pre- and post-experimental tests as well as all their own analyses of the data. We were consequently free to conduct our own very different analyses of the same data aimed at uncovering some clues which might suggest possible answers to the question that tantalized us.

The Primary Study

Don Daiker, Andrew Kerek, and Max Morenberg performed their experiment in the fall of 1976 at the Miami University of Ohio. Their goal was to test the hypothesis that sentence combining instruction would produce a statistically significant increase in syntactic maturity, writing effectiveness, and reading comprehension as compared to traditional composition instruction.

The total experimental population consisted of 290 freshmen assigned by computer in an arbitrary fashion to twelve sections of the required freshman English course. Six of these sections made up the experimental group, and six, the control group. The control and experimental groups had the same amount of composition instruction and wrote the same number of compositions, and teachers were matched by experience, effectiveness, and enthusiasm. The control group's composition program was based primarily on analyses of prose models (taken from the *Harbrace Reader*) and discussions of traditional modes of development and rhetorical principles (from McCrimmon's *Writing With a Purpose*).

The experimental group's program was based entirely on sentence combining. The text was Strong's *Sentence Combining* accompanied by the authors' mimeographed materials.

For the pre- and post-tests, students were given two-hour periods to write essays on one of two matched topics. Half of each group was randomly assigned topic A for the pre-test and topic B for the post- test; the other half was assigned the topics in reverse order. (See Appendix A for the topics.)

Syntactic counts (words, clauses, t-units) were performed by trained raters, and the traditional ratios were computed: words per t-unit, clauses per t-unit, words per clause. In addition, the quality of writing was

judged by experienced teachers (two ratings per piece) using holistic, analytic and forced-choice methods. Finally, a reading comprehension test was assigned. The analyses showed statistically significant differences in the experimental group's increase in length of clauses and t-units (the classic syntactic maturity measures) over that of the control group. In addition, the writing of the sentence combining students was judged to be significantly better than that of the control group classes on the holistic, forced-choice, and four of the six analytic factors. On the reading tests, both groups were comparable.

The Secondary Analysis: The Governing Questions

The key questions governing our secondary analysis of the Miami of Ohio data were the following: Why does sentence combining instruction induce higher quality ratings? What else, if anything, do students learn when they learn to combine sentences? As conceived, these two questions were related so that an answer to the second would at least partially answer the first.

As to the first question, although it has not universally been the case (cf. Mellon 1961, Perron 1974, Sullivan 1977, Callaghan 1977, Stewart 1977), many studies have reported that students who have been subjected to sentence combining treatment achieve higher holistic scores as well as higher scores in syntactic maturity (O'Hare 1973, Combs 1975, Pedersen 1977, Schuster 1976, Waterfall 1977, Swan 1977, Daiker, Kerek and Morenberg 1977). Further, in some studies like Pedersen's and Waterfall's, although students showed little or minimal gains in syntactic maturity, they did show improvements in writing quality.

That sentence combining leads to greater syntactic maturity we would expect, but that it should lead to higher overall holistic scores is not so obvious especially since it has been shown that the higher holistic scores cannot be attributed to the higher syntactic maturity scores. Faigley (1979), for example, by using a series of multiple regression tests, showed that three standard measures of syntactic fluency together predicted less than 3% of the holistic rating, and Daiker, Kerek and Morenberg showed that in combination the syntactic factors predicted from between less than 3% to a maximum of about 7½% of the holistic rating variance. (They computed separate scores for pre- and post-tests, experimental and control groups).

The second question is what, if anything, do students learn when they learn sentence combining. Do they develop new or different mental skills or habits? Do they enhance or acquire other cognitive abilities? There has been interesting theorizing about this question. James Kinneavy, for

example, speculates that "it may be that the most important part of the sentence combining lessons was not the sentence combining but the functional teaching of rhetorical principles connected with the sentence exercises" (1979:66). In other words, in the course of these exercises, especially the uncued Strongian types, students are encouraged to think about the purpose of the whole piece of writing and how best to achieve that end given the various syntactic options available. Sentence combining trains them to think and perform rhetorically.

Carl Bereiter (1981) takes a different tack: he argues that sentence combining helps to automate certain syntactic operations. "Facility gained in this way COULD LESSEN THE ATTENTIONAL BURDEN in later use of such devices during the composing process, thus making it more likely that students could simultaneously hold onto content and manipulate syntax." Bereiter's point is that composing is a complex task involving a host of subprocesses. In composing a text, the writer must, at some level, pay attention to his overall meaning, his choice of syntax, his choice of lexicon, the correct spelling of words, the formation of letters, etc. There is clearly a limit to the capacity of one's attention: when one subprocess necessitates a lot of attention, less is left over for the rest. A child who is learning to print can pay little attention to anything else; however, as she becomes proficient in letter formation, much less conscious attention is required for this subprocess and more is available for, say, choice of words.

The value of sentence combining exercises is that they allow students to focus completely on generating and choosing from among syntactic options; such exercises provide the content so that no attention need be paid to meaning, choice of lexicon, etc. Sufficient such practice, argues Bereiter, makes the generation of such options (and perhaps the criteria for choosing among them) more automated. Consequently, when the writer turns to producing her own text, much less conscious attention needs to be focused on such syntactic rhetorical considerations: the generating and selecting is performed automatically.

John Mellon makes a similar, although not an identical point. He argues that sentence combining practice "exercises the student in the manipulation of surface structure operations in ways that facilitate their subsequent use in actual writing" (1979:21). "Behaviors required by sentence combining," he explains later, "can trigger at the appropriate stage the emergence of the skill which permits sentences to be consciously constructed and reconstructed, as it were, in mid-discourse" (65). In other words, Mellon is suggesting that sentence combining practice facilitates a kind of "on the spot"revising that, he argues, occurs (or can occur) during the composing process of decentred writers.

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The difference between Bereiter and Mellon is that the former argues that, as a result of sentence combining, the process of syntactic rhetorical generating during composing occurs automatically (below the level of consciousness), while for the latter the same process is fully conscious.

Max Morenberg, in a paper presented at *CCCC*, 1981, extended this argument by suggesting that sentence combining trains students in rewriting in general. What is common to these various discussions of sentence combining is the notion that sentence combining encourages and/or facilitates the choosing among syntactic options for presumably the most effective expression of content.

There are some, however, who make larger claims. For example, Frank O'Hare (1973) speculates that such exercises may be generative at the stage of invention in the way that Christensen claimed his exercises were. "Perhaps the syntactic manipulative skill the students had developed, because it entailed a wider practical set of syntactic alternatives, invited or attracted detail. Perhaps knowing *how* does help to create *what*" (1973:72). Others such as Strong (1979) and Pedersen (1977) seem to go further, at least flirting with the notion that sentence combining develops certain cognitive skills. And surely there is at least a speculative case to be made for this position. If syntax provides categories for expressing one's thinking, widening the range of syntactic structures available may extend one's capacity to express one's thinking. That is to say, the change may be felt not at the level of choosing the best among various options for saying what you want to, but for being able to say it at all. Moreover, if one takes even a modified Whorfian position, widening the range of syntactic structures available may allow one not only to say, but also to think certain things, indeed to see them at all.

Mellon vehemently denies the possibility that sentence combining induces cognitive development. He argues that there are two separate kinds of growth involved in increasing syntactic complexity; one that comes about as a result of normal cognitive development or maturation (which he defines as the enrichment of our conceptual knowledge) and one that comes about as a result of the increased use of surface-structure manipulations (the introduction of non-restrictive clauses, i.e. secondary statements into primary statements). Sentence combining achieves only the latter kind of increase in syntactic complexity, he argues; it implies no cognitive growth.[1]

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[1] One could of course question the implication that the introduction of secondary statements into primary ones involves no cognitive development, no increasing sophistication. Hunt (1977) and Loban (1976) show that increased use of such syntactic structures is a concomitant of development, so presumably one could argue the reverse.

What sentence combining does, in other words, has been a matter of some theoretical controversy. There is very little that has been uncovered in the relevant research studies to corroborate or disconfirm any of this speculation. It was then, with a view to searching through the available evidence for more leads, that we decided to perform further analyses of the Daiker, Kerek, and Morenberg data.

The Analyses

In all the sentence combining experiments to date a very limited number of analyses have been performed on the pre- and post-test essays generated by the subjects. Syntactically, words, clauses and T-units have been counted, and the various ratios computed with special emphasis on words per t-unit and clauses per t-unit.

When writing quality has been evaluated, the measure has always been an overall holistic score. Daiker, Kerek and Morenberg went somewhat farther than other such researchers by also performing an analytic rhetorical analysis, according to the following categories: ideas, supporting detail, organization and coherence, voice, sentence structure, and diction/usage.

We chose to develop several different or more precise instruments. First, Ian Pringle developed a very detailed syntactic instrument aimed at determining precisely what syntactic changes took place as a result of sentence combining. The results of those analyses will be reported elsewhere. My own analyses were both rhetorical and cognitive. The rhetorical analytic categories developed by Daiker, Kerek and Morenberg were not suited for answering the questions we had posed for ourselves. Consequently, a different set of rhetorical criteria were developed. The relationship of our instrument to the Daiker, Kerek and Morenberg scale is illustrated in Table 1. Most significantly, their "organization and coherence" category was subdivided into four attempting to get at, first, how well unified the piece was (whether there seemed to be one controlling idea, an underlying sense of purpose); second, how well organized the piece was, how well the individual elements were marshalled to convey that purpose; third, how succinctly and economically the argument was presented; and finally, how cohesive or connected the piece appeared. Cohesiveness was intended in the Halliday and Hasan (1976) sense, that is, the explicit textual indication of connectedness. Our measure, however, was impressionistic and did not involve a count of cohesive ties. It was important to distinguish organization (logical coherence) from cohesiveness (the surface appearance of connectedness), since one might argue that sentence combining exercises simply develop the appearance rather than the fact of logical coherence.

Many of these rhetorical criteria not only characterize the quality of texts, but also imply certain kinds of cognitive processes for their achievement, especially unity and organization. In addition, we used another indicator of the cognitive dimensions of specific texts: this instrument was developed in a previous study (Freedman and Pringle, 1980) and defines the degree to which the writer abstracts from her primary data, whatever the primary data is. The instrument gets at the number of rungs up the ladder of abstracting the writer herself climbs, the degree to which she generalizes about her primary data, and then generalizes about her generalizations, etc.

TABLE 1

ANALYTIC SCALES

Dalker, Kerek and Morenberg	Freedman and Pringle Rhetorical Criteria
Ideas	
Supporting details	Development
Organization and coherence	Unity
	Organization
	Cohesiveness
	Economy
Voice	Overall style
	Vividness
Sentence structure	
Diction and usage	Vocabulary range
	Register

For the rhetorical analysis as well as the level of abstracting, each paper was scored by two independent raters. See Table 2 for a summary of inter-rater correlations.

One final note. Not all the papers elicited in the study were used in each kind of analysis. For the rhetorical analysis as well as the level of abstracting, valid comparisons could only be made where there was identity of what is commonly called mode, but what Kinneavy (1976)

defines as aim. Despite the careful specification of the topics assigned in the study, there was some variation in the essays elicited by aim. Consequently, our first step was to categorize all the papers by aim, using Kinneavy's classification; for the rhetorical and cognitive analyses only those papers were included whose aim was to prove a thesis. The number of students was 134 and of essays 268.

TABLE 2

Inter-Rater Reliability
Rhetorical Criteria

UNITY	.845
ORGANIZATION	.8747
DEVELOPMENT	.8054
REGISTER	.7534
STYLE	.8025
VOCABULARY RANGE	.7921
VIVIDNESS	.8063
ECONOMY	.7753
COHERENCE	.8021

N=134 students (268 essays)
P=.000 unless otherwise indicated

Findings and Discussion: Rhetorical Criteria

As indicated in Table 3, there were increases in both the experimental and the control groups between the pre- and post-test essays. These increases could have simply been a reflection of normal maturation or could have come about as a result of direct instruction in composition; failing comparison with a third, non-instructed group, we cannot know. An analysis of co-variance reveals that the increases in the experimental group were significantly higher on the following criteria: unity, organization, development, style, vocabulary range, vividness, economy, and cohesiveness. It was only on the criterion "register" that the control group increased significantly more than the experimental.

While gains in stylistic effectiveness seem more obviously attributable

to increased syntactic fluency, vividness and vocabulary range cannot so easily be explained. The findings that are most suggestive, however, are the relatively greater increases in unity, organization, cohesiveness, and economy.

How do such increases relate to the sentence combining treatment? To understand this, it is necessary to look more closely at precisely what students do when they combine sentences, especially the free Strongian kind of sentence combining that was used in this study. What such exercises force students to do is to look for relationships, to see or discover inter-relationships among separate kernels or propositions such that the various elements can be combined into a single unit with some elements subordinate and others superordinate. Sentence combining then develops at least a propensity for, or perhaps a skill in looking for the underlying principle whereby propositions may be inter-related and then hierarchically organized within one unit—the t-unit.

The following hypothesis consequently suggests itself. Perhaps this ability at the t-unit level is carried over to the larger discourse level. The increased ratings on unity and organization suggest that the students were increasingly able to find principles of interrelationship among their various ideas and that, as within the t-unit, they were able to organize these various elements into larger hierarchic patterns. Further, the scores on economy suggest that the students were increasingly able to discard superfluous material or ideas. Thus, a skill developed at the t-unit level seems to have been carried over to the whole-text level.

What this implies about what has been learned is not clear. Mellon's comments on learning help to formulate the possibilities. He writes: "As ordinarily used by psychologists..."learning' refers to the acquisition of knowledge and skills. Of 'skills' it is important to remember that a skill once acquired is a skill learned, even though, with the passing of time and owing to changes in the parts of the organism upon which the skill operates, the degree or extent of its application may increase" (1979:16). The question is, then, has sentence combining resulted in the acquisition of a new skill or has it involved the extension of a skill already there to a wider range of material.

There is a further possibility, however. In his discussion of the acquisition of knowledge, which is part of learning, Mellon points out that "the learning of overt conceptual knowledge occurs in two forms—we acquire new concepts and the new words necessary to name and talk about them, and we also add to, and establish an increasingly intricate network of interrelationships among the meanings of concepts we already possess."

Perhaps, and of course this is merely a possibility, sentence combining

TABLE 3

Comparison of Performance according to Rhetorical Criteria

	MEANS						ANALYSIS OF COVARIANCE	
	CONTROL			EXPERIMENTAL				
	PRE	POST	MEAN	PRE	POST	MEAN	F-STATISTIC	SIGNIFICANCE
UNITY	4.457	4.886	.429	4.653	5.959	1.306	4.835	.032
ORGANIZATION	4.543	4.914	.371	4.816	6.082	1.266	6.275	.015
DEVELOPMENT	4.257	4.429	.172	4.612	5.612	1.0	6.004	.017
REGISTER	4.429	4.6	.171	5.163	5.265	.102	9.678	.003
STYLE	5.371	5.571	.2	5.551	6.714	1.163	8.769	.004
VOCABULARY RANGE	4.514	4.371	-.143	4.959	5.245	.286	6.361	.014
VIVIDNESS	4.343	4.286	-.057	4.49	5.592	1.102	15.416	.000
ECONOMY	4.8	5.114	.314	4.898	5.898	1.0	9.418	.003
COHERENCE	5.571	6.114	.543	6.02	6.898	.878	4.112	.047

functions so as to develop the network of interrelationships, or at least develops a habit of mind which looks for interrelationships, which consequently extend conceptual knowledge. In other words, sentence combining if not in itself involving cognitive development, may play an intimate role in its development.

It is important to stress that the evidence here is only suggestive—and far from conclusive. The questions raised, however, are researchable, although a very different kind of experimentation will be required from that conventionally used in sentence combining research.

Level of Abstracting

The analysis according to the cognitive scale (the level of abstracting) provided another important finding which bears directly on the preceding discussion. There was no growth on the level of abstracting for the experimental group. See Table 4. Furthermore, there was growth in the level of abstracting in the control group so that an analysis of co-variance reveals that being in the experimental group had a negative impact, it decreased one's chance of rising on the cognitive scale.

At first glance, this evidence seems to run counter to what we have learned from the rhetorical analyses. Level of abstracting also measures the ability to order within hierarchic patterns; the difference is, however, that level of abstracting measures the ability to move to higher, more inclusive superordinate systems, to higher degrees of abstractness, to larger superstructures within which the smaller structures fit. The sentence combining groups did not show any increase in this ability.

Previous research (Freedman and Pringle, 1980) has shown that growth along the level of abstracting scale does correlate with maturation: third year university students were able to abstract to higher levels than fifth year high school students.

One wonders then why there was no growth at all for the experimental group. It would be useful to be able to compare these results with those of a third group of students who had been exposed to no composition instruction—to see what degree of growth could be expected over this period of time in an academic environment. The question which nags is whether the sentence combining simply did not accelerate growth or whether it actually stultified development. It is possible that the exercises themselves, by training students to focus only on the content provided in the text, discourage any attempts to go beyond and outside the ideas presented; perhaps this tendency becomes habitual so that generalizing, interpreting and inferencing are all discouraged. If so, this is a danger that all teachers should be apprised of.

TABLE 4

Comparison of Performance
According to Level of Abstracting and Number of Points

	MEANS						ANALYSIS OF COVARIANCE	
	CONTROL			EXPERIMENTAL				
	PRE	POST	MEAN	PRE	POST	MEAN	F-STATISTIC	SIGNIFICANCE
Level of Abstracting	2.974	3.439	.465	2.716	2.70	-.016	47.934	.000
Number of Points	5.132	5.053	-.079	5.519	4.682	-.837	25.503	.000

(N=114 STUDENTS, 228 ESSAYS)

Note: There is a significant gain on the "level of abstracting" for the CONTROL group (relative to the experimental), and a significant loss in the number of points for the EXPERIMENTAL group (relative to the control).

It is also important to know whether the traditional composition program accelerates growth in abstracting and, if so, how. What we know about these programs is that they focus on analysis of models and discussions of rhetoric. What in this could have encouraged growth? Possibly the texts read themselves. Possibly the free wheeling, speculative discussions that sometimes take place in the context of reading-based composition instruction. The point is that without far more knowledge about exactly what transpires in the control (as well as in the experimental) classrooms we simply do not know.

Conclusion

We have ended with more questions than we began with. However, although we have not answered our original questions, our re-analysis has allowed for some conjectures.

Sentence combining does seem to develop or enhance certain skills, or perhaps just habits of mind, at the t-unit level, which then transfer to the whole discourse level and consequently result in more unified, organized, coherent, and concise pieces of writing. Whether its impact can be categorized as the development of a skill or simply its extension, whether it stimulates real cognitive development or creates a set of useful habits—all this remains to be explored.

Further, what sentence combining does not do, at least in the short run, is develop the ability (or inclination) to ascend to higher levels of abstracting, although other composition programs seem to achieve such an end.

It has become clear as well that, to answer what are certainly very important questions about sentence combining, more and different research must take place. The following avenues suggest themselves.

1. It is important to start conducting observational studies, focusing on exactly what does happen in the writing classrooms, both those that use and those that do not use sentence combining.
2. It is also important to compare the achievements of students whose composition programs involve sentence combining and those in traditional programs with students who are given no direct instruction in writing.
3. To see whether cognitive changes do take place, and to define these changes, the experimental procedures as well as the testing instruments of cognitive psychology should be enlisted. For example, one might use composing aloud as a way of discovering what happens during sentence combining exercises themselves (both structured and unstructured) and as a way of seeing the impact of sentence combining in other kinds of writing.

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